ventricular contractility or anti- arrhythmic properties of β-blockers. β-blockers may also prevent plaque rupture in coronary arteries by reducing mechanical stress on the coronary plaques (Lopez-Sendon J, et.al. Eur Heart J 2004:25:1341-62) and may decrease circulating levels of C-reactive protein thereby stabilizing coronary plaques through anti inflammatory mechanisms (Jenkins NP, et.al. Am J Med 2002;112:269-74). The duration of β-blocker treatment before vascular surgery and its effect on cardiovascular outcome in vascular surgical patients has not, however, been specifically studied. The authors sought to evaluate the timing of β-blocker initiation and its influence on preoperative heart rate, C-reactive protein levels, and post operative outcome in a cohort of patients undergoing vascular surgery.

Preoperative heart rate and high sensitive C-reactive protein (CRP) levels were recorded in 940 vascular surgical patients with respect to time of the β-blocker initiation before surgery. Initiation of β-blocker's was divided into three time periods, <1 week prior to surgery, 1-4 weeks prior to surgery, and >4 weeks prior to surgery. Troponin- T measurements were made pre and post operatively and electrocardiograms were also routinely obtained. The endpoints of the study included 30 day cardiac events (a composite of myocardial infarction and cardiac mortality) as well as long term mortality. The relationship between duration of β-blocker treatment and outcome was evaluated by multi-variant regression analysis adjusted to cardiac risk factors.

There were 158 patients (17%) who had β-blockers initiated <1 week prior to vascular surgery. There were 393 patients (42%) who had β-blocker therapy initiated between 1 and 4 weeks prior to vascular surgery and 389 patients (41%) who had β-blocker therapy more than 4 weeks prior to vascular surgery. In comparing heart-rates of new patients with β-blocker therapy initiated < 1 week preoperatively to those patients where therapy was initiated >1 week preoperatively there was a significant decrease in median heart rate in the patients with therapy initiated >1 week preoperatively (74 ± 17 beats/min versus 66 ± 15 beats/min; $P < 0.001$). Median CRP levels were not different in patients in which β-blocker therapy was initiated >1 week preoperatively compared to patients in which β-blocker therapy was initiated <1 week preoperatively ($P = .782$). There was a lower incidence of 30 day cardiac events in patients in which β-blocker therapy was initiated >1 week to 4 weeks or >4 weeks prior to surgery compared to those where therapy was initiated < 1 week prior to vascular surgery (OR, 0.46; 95% CI, 0.27-0.76; OR, 0.48; 95% CI, 0.29-0.79). There was also improved long term mortality in patients with β-blocker therapy initiated between 1 and 4 weeks and >4 weeks preoperatively compared to those with therapy initiated <1 week preoperatively (HR, 0.52; 95% CI, 021-0.67; and HR, 0.50; 95% CI, 0.25-0.71, respectively). There were there perioperative strokes in the patients in whom β-blocker therapy was initiated <1 week preoperatively versus 4 perioperative strokes in the patients where β-blocker therapy was initiated more than 1 week preoperatively ($P = .021$).

Comment: There appear to be significant advantages to initiating β-blocker therapy more than 1 week preoperatively in patients undergoing vascular surgery. A number of questions do remain. Could one prescribe higher β-blocker doses to achieve more rapid heart rate control and then be able to routinely start treatment <1 week preoperatively? Or, will more aggressive up titration of β-blocker therapy perhaps lead to potential overdosing of the drug and more side effects? Indeed, the POSIE trial suggested that higher β-blocker doses without up -titration in surgical patients can lead to an increased incidence of bradycardia, hypertension and stroke. Clearly, trying to initiate β-blocker therapy with monitoring and up titration of therapy in less than a week would poses logistical difficulties. Another question is whether to use perioperative β-blockers in β-blocker naïve patients who require urgent vascular surgery? What this trial tells us is that in elective cases of vascular surgery one should start β-blockers more than one week prior to surgery. What to do with β-blocker naïve patients who require urgent operation remains an open question as does how rapidly can β-blockers be safely introduced to the preoperative vascular surgery patient.

Women with Peripheral Arterial Disease Experience Faster Functional Decline than Men with Peripheral Arterial Disease

McDermott MM, Ferrucci L, Liu K, et al. J Am Coll Cardiol 2011;57:707-14.

Conclusion: Women with peripheral arterial disease (PAD) have greater loss of mobility and faster functional decline than men with PAD. Differences may be attributable to women with PAD having smaller baseline calf muscle area than men with PAD.

Summary: The prevalence of PAD in older patients is the same in women as in men and may be higher (Vavra AK. Women's Health 2009;5:669-83). It has been demonstrated women with PAD have decreased lower extremity strength and greater functional impairment than men with PAD (McDermott MM. J Am Geriatric Soc 2003;51:222-8). In this study the authors determined whether there are sex differences in rate of functional decline over time and whether there are differences in rates of change of calf muscles characteristics over time between men and women with PAD.

This was a longitudinal observational study. Rates of mobility loss, decline in six minute walk performance, and decline in walking velocity between men and women with PAD were determined at baseline and at 4 years of follow up. Baseline measurements of calf muscle characteristics and leg strength and changes in these muscle parameters between women and men with PAD were also determined at baseline and at 4 years of follow up. There were 380 men and women with PAD who completed a six minute walk test and were assessed for mobility, disability, and who underwent an evaluation of 4 meter walking velocity at baseline and annually for up to 4 years. Calf muscle characteristics were measured biannually with computed tomography. Outcomes included becoming unable to walk for 6 minutes continuously among patients who could walk continuously for 6 minutes at baseline. An additional outcome was mobility loss defined as becoming unable to walk for one-quarter mile or to walk up and down one flight of stairs without assistance. Adjustments were made for race, age, body mass index, the ankle brachial index, physical activity, comorbidities, and other confounders.

At 4 years of follow-up, women were more likely to become unable to walk for 6 minutes continuously (HR, 2.3; 95%CI, 1.3-4.06; $P = .004$). Women were more likely to develop mobility disability (HR, 1.79; 95% CI, 1.3-3.03; $P = .03$). Women also had faster declines in walking velocity ($P = .022$) and distance achieved during the 6 minute walk ($P = .041$). After adjustment for a baseline sex differences in calf muscle area sex differences in functional decline were no longer statically significant.

Comment: In this study women had smaller calf muscle area and lower calf muscle densities and less knee extension strength at baseline compared to men. With adjustments in the analysis sex differences in functional decline between women and men with PAD disappeared. This suggests poorer functional performance at baseline among women compared to men results in women being closer at baseline to thresholds for mobility loss and physical dysfunction. Interventions to improve lower extremity strength among women with PAD may slow their functional decline.